

<b>SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT</b>  <i>ENGINEERING DIVISION</i>  <b>APPLICATION PROCESSING AND CALCULATIONS</b>	PAGES 45	PAGE 1
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**PERMIT TO CONSTRUCT EVALUATION**

**APPLICANT:**

Southern California Edison  
2244 Walnut Grove Ave  
Rosemead, CA 91770

**EQUIPMENT LOCATION:**

9000 Etiwanda Ave.  
Rancho Cucamonga CA 91739

**EQUIPMENT DESCRIPTION:**

Section H of the Facility Permit, ID# 149620

Equipment	ID No.	Connected To	RECLAIM Source Type/ Monitoring Unit	Emissions and Requirements	Conditions
PROCESS 1: POWER GENERATION					
SYSTEM 1: GAS TURBINE					
GAS TURBINE, UNIT NO. 1, NATURAL GAS, GENERAL ELECTRIC MODEL LM6000PC SPRINT, SIMPLE CYCLE WITH WATER INJECTION, 467 MMBTU/HR, WITH A/N: 461460  GENERATOR, 45 MW	D1			CO: 6 PPM NATURAL GAS (4) [RULE 1303(a)(1)-BACT]; CO: 2000 PPM (5) [RULE 407]; NOX: 2.5 PPM NATURAL GAS (4) [RULE 1303(a)(1)-BACT]; NOX:25 PPM NATURAL GAS (8) [40 CFR60 SUBPART KKKK]; VOC: 2 PPM NATURAL GAS (4) [RULE 1303(A)(1)-BACT]; PM: 0.1 GR/SCF (5) [RULE 409]; PM: 11 LBS/HR (5) [RULE 475]; PM: 0.01 GR/SCF (5A) [RULE 475]; SOX: 0.060 LBS/MMBTU (8) [40CFR 60 SUBPART KKKK] SO2: (9) [40CFR 72 – ACID RAIN]	A63.1, A63.2, A63.3, A99.1, A99.2, A99.3, A195.1, A195.2, A195.3, A327.1, D12.1, C1.1, C1.2, C1.3, D29.1, D29.2, D29.3, D82.1, E193.3, K40.1, K67.1
CO OXIDATION CATALYST, BASF, 80 CUBIC FEET OF TOTAL CATALYST VOLUME A/N: 461462	C2				
SELECTIVE CATALYTIC REDUCTION, CORMETECH CMHT-21, WITH 547 CUBIC FEET OF TOTAL CATALYST VOLUME. HEIGHT: 25 FT 9	C3			NH3: 5 PPM (4) [RULE 1303(a)(1)-BACT]	A195.4, D12.2, D12.3, D12.4, E179.1, E179.2, E193.1

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Equipment	ID No.	Connected To	RECLAIM Source Type/ Monitoring Unit	Emissions and Requirements	Conditions
<b>PROCESS 1: POWER GENERATION</b>					
<b>SYSTEM 1: GAS TURBINE</b>					
IN; WIDTH: 18 FT 0 IN; DEPTH: 2 FT 6 IN; WITH A/N: 461462  NH3 INJECTION GRID					
STACK, TURBINE NO. 1, DIAMETER: 13 FT, HEIGHT: 80 FT A/N: 461460	S4				
<b>SYSTEM 2: EMERGENCY IC ENGINE</b>					
INTERNAL COMBUSTION ENGINE, EMERGENCY POWER, NATURAL GAS, WAUKESHA, MODEL VGF36 GL/GLD, 865 BHP A/N: 461461	D5			NOX: 1.25 GR/BHPH (4) [RULE 1303-BACT] CO: 1.75 GR/BHPH (4) [RULE 1303-BACT]; VOC (4) 0.45 GR/BHPH (4) [RULE 1303-BACT]	C1.4, D12.5, D29.4, K67.2, E162.1, E193.2
<b>SYSTEM 3: INORGANIC CHEMICAL STORAGE</b>					
STORAGE TANK, TK-1, FIXED ROOF, 19 PERCENT AQUEOUS AMMONIA, 10,000 GALLONS A/N: 461463	D6				E144.1, C157.1
<b>SYSTEM 4: RULE 219 EXEMPT EQUIPMENT SUBJECT TO SOURCE SPECIFIC RULES</b>					
RULE 219 EXEMPT EQUIPMENT, COATING EQUIPMENT, PORTABLE, ARCHITECTURAL COATING	E7			VOC: (9) [Rule 1113, Rule 1171]	K67.3
RULE 219 EXEMPT EQUIPMENT, EXEMPT HAND WIPING OPERATIONS	E8			VOC: (9) [Rule 1171]	
RULE 219 EXEMPT EQUIPMENT REFRIGERATION UNITS	E11				

#### **FACILITY DESCRIPTION**

The proposed site is located at 9000 Etiwanda Ave, in Rancho Cucamonga, CA 91739, adjacent to an existing SCE substation where electrical interconnections will be made. The site is also adjacent to the Reliant Energy power plant to the east. To the south is a vacant lot owned by SCE where a new 500 kv substation is proposed. To the north is a railroad right-of-way and heavy industrial buildings, and to the west is a railroad-right-of-way and commercial buildings.

The SCE facility will consist of a natural gas fired GE LM6000 combustion turbine generator rated at 45 net MW, associated air pollution control equipment in the form of in-duct oxidation

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and reduction catalysts, a 10,000 gallon aqueous ammonia storage tank, and an 845 hp emergency internal combustion engine.

The turbine will operate as a peaking unit, mainly coming on line in the summer months when demand is highest. SCE is proposing operational limits on the turbine to minimize emissions impacts. The following table outlines the expected annual operating schedule of the turbine:

*Proposed Annual Operating Schedule*

	1st Year	Subsequent Years
Normal Operations	1336 hours	1455 hours
Start-up	60 starts	120 starts
Shutdown	60 shutdowns	120 shutdowns
Commissioning*	25 hours	0 hours

\*Commissioning of the turbine will occur during the first year of operation only.

SCE has proposed that the permit for the turbine include conditions which limit the fuel use and NO<sub>x</sub> emissions. The permit will also limit number of start ups allowed, and the duration of each start as follows:

*Proposed Operating Limits*

Daily Fuel Use	4.43 mmcf/day
Annual Fuel Use	597 mmcf/year for the 1 <sup>st</sup> year of operation, and 683 mmcf/yr for each year thereafter
NO <sub>x</sub> emissions	4 tons/yr
Number of starts	60 for the 1 <sup>st</sup> year, 120 thereafter
Start up duration	15 minutes

There will be additional conditions limiting the monthly emissions of all criteria pollutants as required by Rule 1313. See discussion under Regulation XIII.

## **BACKGROUND:**

The SCE, Etiwanda facility will be a new facility as there are no current stationary sources. Emissions will be below the RECLAIM thresholds, and SCE will not opt into RECLAIM. The facility will, however, be included in Title V because it is subject to the Federal Acid Rain provisions.

The following applications were submitted for this project:

Table A-1 – Project Application Numbers

A/N	Submittal Date	Equipment
461460	10/26/06	Gas turbine
461461	10/26/06	Emergency IC engine
461462	10/26/06	SCR/CO catalysts
461463	10/26/06	Ammonia tank
463003	11/17/06	Title V

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SCE is under directive from the California Public Utilities Commission (CPUC) to install up to 250 MW of black-start, dispatchable generating capacity in its service territory for the upcoming 2007 summer season. In response to this directive SCE has applied to install GE LM6000 gas turbine generators at each of the following sites in the AQMD's jurisdiction:

Table A-2 – SCE Proposed New Power Generation

Substation	Address
Ontario	13568 Milliken Ave, Mira Loma 91752
Center	10601 Firestone Blvd, Norwalk 90650
Etiwanda	9000 Etiwanda Ave, Rancho Cucamonga 91739
Barre	8662 Cerritos Ave, Stanton 90680

There will also be a 5th site located in Ventura County.

### **PROCESS DESCRIPTION:**

#### New Turbine

SCE is proposing the installation of a new simple cycle combustion turbine at the Etiwanda Substation. The turbine will be a GE LM6000 Enhanced Sprint, rated at 47.4 MW. The LM6000 is a 2-shaft engine derived from the CF6-80C2 jet aircraft engine. The Enhanced Sprint version of this engine is intercooled with mist injected into both the low and high pressure compressors for increased output and efficiency. The turbine is designed to fire natural gas only.

Net heat rate is 9152 btu/kWh (LHV), or approximately 10067 btu/kWh (HHV). There is no bypass stack.

#### CEMS Systems

Continuous emission monitoring in the turbine exhaust will be required for NO<sub>x</sub>, CO and O<sub>2</sub>. Other parameters which will be required to be measured and recorded include the fuel use (40CFR60), water injection rate (Rule 1303, 40CFR60), ammonia injection rate (1303), exhaust temperature prior to the SCR catalyst (1303), pressure drop across the SCR catalyst, and the NO<sub>x</sub> concentration prior to the SCR catalyst (for precise control of the ammonia injection rate and determination of ammonia slip).

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TABLE B-1 - Gas Turbine Data

Specification	
Manufacturer	GE
Model	LM6000 Sprint
Fuel Type	Pipeline Natural Gas
Maximum Fuel Consumption	0.409 mmscf/hr
Maximum GT exhaust flow	13.05 mmscf/hr
Gas Turbine Heat Input	423.0 mmbtu/hr maximum
Maximum Gas Turbine Output	50 MW gross
Net Plant Heat Rate, LHV	9152 Btu/kw-hr
Net Plant Heat Rate, HHV	10067 Btu/kw-hr
Net Plant Efficiency (LHV)	37%
Unabated NOx Emission Rate	61 ppm

## Control Systems

### Water Injection

The water injection system will use demineralized water injected into the combustor through ports in the fuel nozzles. Water is supplied to the nozzles through a water manifold. During a startup, water injection begins when the turbine reaches a load of about 5 MW, which takes approximately 12 minutes. During a shutdown, water injection stops around 10 MW. Maximum water flow is 50 gpm (1.1 water to fuel ratio). The water injection system is designed to reduce NOx emissions to 25 ppm in the exhaust prior to the SCR catalyst. Raw water will be stored in a 125,000 tank before being demineralized on site and moved to a 50,000 gallon deionized water tank.

### SCR

The SCR catalyst is manufactured by Cormetech. It will be a high temperature vanadium catalyst, with the ammonia injection temperature beginning at 540°F up to a maximum 870°F. Thermal degradation begins at temperatures above 875°F. The manufacturer guarantees NOx emission of 2.5 ppm NOx at 15% O2 with 5 ppm NH3 slip at 15% O2.

A tempering air system will be installed to insure that the flue gas temperature does not exceed 830°F, which is near the upper operating range of the SCR catalyst. The system will consist of 2 fans which can provide between 11,000 acfm and 18,000 acfm of ambient air into the gas turbine exhaust stream. When the turbine is new the minimum air flow will be injected continuously, as the turbine degrades with time, the air flow will be increased to maintain the desired exhaust temperature.

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Table B-2 - SCR Data

Specification	
Manufacturer	Cormetech
Catalyst Type	Model CMHT-21, vanadia-titania
Catalyst Volume	547 ft <sup>3</sup>
Reactor Dimensions	51 X 11 X 3 feet
Space Velocity	25,540 hr <sup>-1</sup>
Area Velocity	15.3 Nm/hr
Ammonia Injection Rate	110 lbs/hr, 0.27 gpm max
Ammonia Slip	5 ppm 1 hour average at 15% O <sub>2</sub>
Outlet NO <sub>x</sub>	2.5 ppm 1 hour avg at 15% O <sub>2</sub>
SCR/CO catalyst Total Cost	approx. \$2.8 million

#### CO catalyst

The CO catalyst is manufactured by BASF Catalysts LLC (formally Engelhard). The emission guarantee is 6 ppm CO and 2 ppm VOC at 15% O<sub>2</sub>.

Table B-3 - CO Catalyst Data

Specification	
Manufacturer	BASF Catalysts
Catalyst Type	CAMET metal substrate
Catalyst Volume	80 ft <sup>3</sup>
Space Velocity	205,000 hr <sup>-1</sup>
Outlet CO	6 ppm ( 1 hour avg) at 15% O <sub>2</sub>
Outlet VOC	2 ppm (1 hour average) at 15% O <sub>2</sub>
Minimum Operating Temp	500°F

#### Cooling Towers

There are no cooling towers proposed.

#### Black Start Engine

The black start engine will be used only in emergency situations where grid power is unavailable to start the turbine. In those situations, the black start engine will be used to provide power for the turbine starter motor, in order for the turbine to be started and begin providing power to the grid. Once the turbine is started, the black start engine is shutdown. The engine will also be exercised for ½ hour every month to insure that it is operating properly. SCE has indicated that the total yearly operating time for the engine will not exceed 7 hours, including any emergency operation. The engine is a Waukeschau VGF36GL/GLD rated at 645 kw (865 hp), at 1800 rpm, fired on natural gas. It is a 4-stroke lean burn engine with 12 cylinders. There is no emission control catalyst or SCR proposed. The engine manufacturer has guaranteed emission levels which meet current BACT for this type of equipment (see further discussion under 'Emissions').

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#### Ammonia Storage

There will be one 10,500 gallon aqueous ammonia tank to serve the SCR. Ammonia will be stored in a 19% aqueous solution. The tank will be a pressure vessel, with a PRV set at 50 psig. The tank is designed so that under normal operating conditions, the pressure will not exceed the prv setting. There is a vapor return line for use during the loading operation. During loading, vapors from the tanks are vented back to the filling truck through the vapor return line.

Expected maximum ammonia use is about 16 gallons per hour (110 lbs/hr / 7 lbs/gal). At the proposed maximum annual hours of operation, estimated annual aqueous ammonia use is 23,280 gallons (16 gph X 1455 hrs/yr), or about 2.3 tank turnovers per year. Ammonia will be delivered to the site in 7,000 gallon trucks. There will be up to 4 truck deliveries per year.

#### EMISSIONS:

Emissions from the gas turbine will consist of all 5 criteria pollutants plus toxics. Emissions are calculated for 4 basic operational modes as follows:

1. commissioning – a 1 time event which occurs following installation and just prior to bringing the turbine online for commercial operation
2. start up – occurs each time the turbine is started
3. normal operation
4. shutdown – occurs each time the turbine is shutdown

Reference Appendix A for the calculations. Following is a summary:

Table C-1  
Maximum Hourly Emissions, Normal Operations

Pollutant	Uncontrolled Hourly Emissions	Controlled Hourly Emissions
NOx	105.00	4.20
CO	40.67	6.10
VOC	1.90	1.27
PM10	4.51	4.51
SOx	0.25	0.25
NH3	3.10	3.10

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Table C-2

Maximum Hourly Emissions, Startup and Shutdown

Pollutant	Startup Hourly Emissions	Shutdown Hourly Emissions
NOx	7.66	6.44
CO	8.58	7.69
VOC	1.34	1.33
PM10	4.51	4.51
SOx	0.25	0.25

Table C-3

Maximum Daily Emissions

Pollutant	Uncontrolled Daily Emissions	Controlled Daily Emissions*
NOx	1154.22	51.87
CO	447.03	71.28
VOC	20.84	14.09
PM10	49.58	49.69
SOx	2.75	2.75
NH3	34.08	40.31

\* includes 1 start up and shutdown

Table C-4 Commissioning Emissions

Pollutant	Total Emissions, Lbs
NOx	1339.50
CO	1752.50
VOC	83.25
PM10	112.75
SOx	6.25

Table C-5 Annual Emissions, Commissioning Year

Pollutant	Controlled Emissions*	Commissioning Emissions	Total Annual Emissions	
	lbs/yr	Lbs	lbs/yr	Tpy
NOx	6458.84	1339.50	7798.34	3.90
CO	9128.18	1555.00	10683.18	5.34
VOC	1857.41	83.25	1940.66	0.97
PM10	6568.32	112.75	6681.07	3.34
SOx	364.10	6.25	370.35	0.19

\*Assumes 60 starts and 60 shutdowns per year, 597 mmcf/yr total fuel use



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Table C-6 Annual Emissions, Non-commissioning year

Pollutant	Total Annual Emissions*	
	lbs/yr	Tpy
NOx	7802.11	3.90
CO	10826.61	5.41
VOC	2167.98	1.08
PM10	7643.50	3.82
SOx	423.70	0.21
NH3	4509.85	2.25

\*Assumes 120 starts and 120 shutdowns per year, 683 mmcf/yr total fuel use

Table C-7 Monthly Emissions

Pollutant	Controlled Emissions 30 SU/SD lbs/month
NOx	1556.06
CO	2133.74
VOC	422.72
PM10	1487.29
SOx	82.44

Monthly emissions are calculated assuming daily fuel use of 4.43 mmcf/day and 1 start/shutdown per day, for 30 days.

#### Black Start Engine Emissions

Emissions from the black start generator will consist of all 5 criteria pollutants plus toxics. Reference Appendix B for the calculations. Below is a summary:

Table C-7 Engine Emissions

Pollutant	Emissions	
	lbs/hr	Lbs/yr
NOx	2.3816	16.671
CO	3.3343	23.340
VOC	0.8574	6.002
PM10	0.0637	0.446
SOx	0.0038	0.026

#### Ammonia Tank Emissions

Storage losses are assumed to be zero for a pressure tank under normal operating conditions. It is not expected that the operating pressure of the tank would exceed the 50 psig pressure valve

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setting under normal conditions. Similarly, transfer losses are considered negligible with the use of the vapor return line.

## **EVALUATION:**

### **RULE 212-Standards for Approving Permits**

This project is subject to Rule 212 public notice requirements because the daily maximum CO, NOx, and PM10 emissions from the project will all exceed the emissions thresholds specified in subdivision (g) of this rule. The facility is not located within 1000 feet of a school (the closest school is West Heritage Elementary located approximately 1.9 miles NE of the site). The District will prepare the public notice and it will contain sufficient information to fully describe the project.

In accordance with subdivision (d) of this rule, the applicant will be required to distribute the public notice to each address within ¼ mile radius of the project.

Subdivision (g) requires that the public notification and comment process include all applicable provisions of 40 CFR Part 51, Section 51.161(b) and 40 CFR Part 124, Section 124.10. The minimum requirements specified in the above documents are included in paragraphs (g)(1), (g)(2), and (g)(3).

In accordance with paragraph (g)(1) of this rule, the District will make the following information available for public inspection at the City of Rancho Cucamonga Public Library (Paul A. Biane Library) located at 12505 Cultural Center Drive, Rancho Cucamonga 91739, during the 30-day comment period: public notice, project information submitted by the applicant, and the District's permit to construct evaluation.

In accordance with paragraph (g)(2) of this rule, the public notice will be published in a newspaper which serves the area that will be impacted by the project.

In accordance with paragraph (g)(3) of this rule, the public notice will be mailed to the following persons: the applicant, the Region IX EPA administrator, the ARB, the chief executives of the city and county where the project will be located, the regional land use planning agency, and the state and federal land managers whose lands may be affected by the emissions from the proposed project.

After the public notice is published, there will be a 30-day period for submittal of public comments.

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**RULE 218 – Continuous Emission Monitoring**

In accordance with Rule 218(c), (e), (f), the applicant is required to submit an “Application for CEMS” for CO CEMS for each CT and required to adhere to retention of records requirements and reporting requirements once approval to operate CO CEMS is granted. Compliance with this rule is expected.

**RULE 401 – Visible Emissions**

This rule limits visible emissions to an opacity of less than 20 percent (Ringlemann No.1), as published by the United States Bureau of Mines. Visible emissions are not expected under normal operation from either the turbine, engine, or ammonia tank.

**RULE 402 - Nuisance**

This rule requires that a person not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which cause, or have a natural tendency to cause injury or damage to business or property. The subject equipment, including the turbine, engine, and ammonia tank, is not expected to create nuisance problems.

**RULE 403 – Fugitive Dust**

The purpose of this rule is to reduce the amount of particulate matter entrained in the ambient air as a result of man-made fugitive dust sources by requiring actions to prevent, reduce, or mitigate fugitive dust emissions. The provisions of this rule apply to any activity or man-made condition capable of generating fugitive dust. This rule prohibits emissions of fugitive dust beyond the property line of the emission source. The applicant will be taking steps to prevent and/or reduce or mitigate fugitive dust emissions from the project site. Such measures include covering loose material on haul vehicles, watering, and using chemical stabilizers when necessary. The installation and operation of the turbine, engine, and ammonia tank is expected to comply with this rule.

**RULE 407 – Liquid and Gaseous Air Contaminants**

This rule limits CO emissions to 2000 ppmv. The SO<sub>2</sub> portion of the rule does not apply as the natural gas fired in the turbine will be subject to the sulfur limit in Rule 431.1. The CO emissions from the turbine will be controlled by an oxidation catalyst to 6 ppmvd at 15% O<sub>2</sub>. Therefore, compliance with this rule is expected. The black start engine is not subject to this rule.

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**RULE 409 – Combustion Contaminants**

This rule restricts the discharge of contaminants from the combustion of fuel to 0.23 grams per cubic meter (0.1 grain per cubic foot) of gas, calculated to 12% CO<sub>2</sub>, averaged over 15 minutes. The turbine is expected to meet this limit at the maximum firing load based on the calculations shown below. Compliance will be verified through the initial performance test.

$$\text{Grain Loading} = [(A \times B)/(C \times D)] \times 7000 \text{ gr/lb}$$

where:

A = PM10 emission rate during normal operation, 4.0 lb/hr

B = Rule specified percent of CO<sub>2</sub> in the exhaust (12%)

C = Percent of CO<sub>2</sub> in the exhaust (approx. 4.29% for natural gas)

D = Stack exhaust flow rate, 4.61 scf/hr

$$\begin{aligned} \text{Grain Loading} &= \frac{4.0 \text{ lbs/hr} \times [(7000 \text{ grains/lb}) \times (12/4.29)]}{4.61 \text{ E}+06 \text{ scf/hr}} \\ &= \boxed{0.017 \text{ grains/scf}} \end{aligned}$$

The black start engine is not subject to this rule.

**RULE 431.1 – Sulfur Content of Gaseous Fuels**

The natural gas supplied to the turbine and the black start engine is expected to comply with the 16 ppmv sulfur limit (calculated as H<sub>2</sub>S) specified in this rule. Commercial grade natural gas has an average sulfur content of 4ppm. The applicant will comply with reporting and record keeping requirements as outlined in subdivision (e) of this rule.

**RULE 475 – Electric Power Generating Equipment**

This rule applies to power generating equipment greater than 10 MW installed after May 7, 1976. Requirements are that the equipment meet a limit for combustion contaminants of 11 lbs/hr or 0.01 gr/scf. Compliance is achieved if either the mass limit or the concentration limit is met. Mass PM10 emissions from the turbine are estimated at 4.0 lbs/hr, and 0.0061 gr/scf during natural gas firing at maximum firing load (see calculations below). Therefore, compliance is expected. Compliance will be verified through the initial performance test.

$$\text{Stack Exhaust Flow} \left( \frac{\text{scf}}{\text{hr}} \right) = F_d \times \frac{20.9}{(20.9 - \%O_2)} \times TFD$$

where:

Fd: Dry F factor for fuel type, 8710 dscf/MMBtu

O<sub>2</sub>: Rule specific dry oxygen content in the effluent stream, 3%

TFD: Total fired duty measured at HHV, 453 MMBtu/hr

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$$\text{Combustion Particulate} \left( \frac{\text{grain}}{\text{scf}} \right) = \frac{PM_{10}, \text{ lb / hr}}{\text{Stack Exhaust Flow, scf / hr}} \times 7000 \frac{\text{gr}}{\text{lb}}$$

Stack flow = 8710(20.9/17.9)\*453 = 4.61 mmscf/hr

Combustion particulate = (4.0/4.61E+06)\*7000 = 0.0061 gr/scf

*Rule 1134 – Emissions of NOx from Gas Turbines*

This rule applies to gas turbines, 0.3 MW and larger, installed on or before August 4, 1989. Therefore, as a new installation, the proposed SCE turbine is not subject to this rule.

*Rule 1135 – Emissions of NOx from Electric Power Generating Systems*

This rule applies to the electric power generating systems of several of the major utility companies in the basin, including SCE. The plants which are included in the RECLAIM program are no longer subject to the requirements of this rule. The proposed SCE Etiwanda plant will not be in RECLAIM. However, the new simple cycle turbine does not fall under the definition of an “electric power generating system.” Under the rule, an electric power generating system is defined as all boilers or replacement units and all alternative or advanced combustion devices. An advanced combustion device is further defined as a cogeneration, combined cycle, intercooled, chemically recuperated, or other advanced combustion turbine, while an alternative resource is solar, geothermal, wind generation, etc. Therefore, the proposed SCE turbine is not subject to the requirements of Rule 1135.

*REGULATION XIII – New Source Review*

The 3 permitted sources at Etiwanda are subject to NSR. The requirements for each source are discussed below. The Etiwanda facility is not a major source because the total emissions from the facility are below the major source threshold of 10 tpy (reference Appendix F). Therefore, the additional requirements for major sources are not applicable.

*1. Turbine BACT*

The facility is considered a non-major source under Regulation XIII because emissions are under the thresholds of 10 tpy. For a non-major sources, BACT is the most stringent emission limit or control technology that is either found in a State Implementation Plan, Achieved in Practice, or Technologically feasible and cost effective. The following table summarizes the current minor source BACT, based on emission levels achieved in practice for this type of equipment.

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TABLE D-1 Required Minor Source BACT

NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	SO <sub>x</sub>	NH <sub>3</sub>
2.5 ppmdv @ 15% O <sub>2</sub> , 1 hour average	6 ppmdv @ 15% O <sub>2</sub> , 1 hour average	2 ppmdv @ 15% O <sub>2</sub> , 1 hour average	An emission limit corresponding to natural gas with fuel sulfur content of no more than 1 grain/100 scf	An emission limit corresponding to natural gas with fuel sulfur content of no more than 1 grain/100 scf (no more than 0.55ppmvd@15% O <sub>2</sub> )	5.0 ppmdv @ 15% O <sub>2</sub> , 1 hour average

The applicant is proposing the following emission levels for this project. The emission levels in the table are manufacturer guaranteed emissions under normal operating conditions.

TABLE D-2– Proposed Control Levels for the Etiwanda Turbine

NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	SO <sub>x</sub>	NH <sub>3</sub>
2.5 ppmvd @ 15% O <sub>2</sub> , 1 hour average	6 ppmvd @ 15% O <sub>2</sub> , 1 hour average	2 ppmvd @ 15% O <sub>2</sub> , 1 hour average	Exclusive use of natural gas fuel, PM <sub>10</sub> emissions of 4 lbs/hr	Exclusive use of natural gas fuel	5 ppmdv @ 15% O <sub>2</sub> , 1 hour average

*\*Natural gas provided by the Gas Company is limited to 16 ppm in the South Coast by Rule 431.1. Generally, the actual sulfur content is 4 ppm (4 ppm corresponds to 0.25 gr/100 scf)*

The NO<sub>x</sub>, CO, VOC, and PM<sub>10</sub> emission rates are based on manufacturer guarantees.

## 2. Turbine Modeling

Rule 1303(b)(1) requires air dispersion modeling for NO<sub>x</sub>, CO and PM<sub>10</sub> to determine the impact from emissions on the air quality standards. Modeling evaluations were performed using USEPA Industrial Source Complex – PRIME (ISC-PRIME version 04269) and representative meteorological data from the Fontana meteorological station. Modeling analysis was performed for turbine startup and black start engine operation, normal turbine and black start engine operation, and turbine commissioning operations. Model inputs are shown in Appendix C. The air basin where the plant is proposed is in attainment for NO<sub>2</sub>, CO, and SO<sub>2</sub>, and is in non-attainment for PM<sub>10</sub>. Therefore, the compliance determination for NO<sub>2</sub>, CO, and SO<sub>2</sub> is a comparison of the project impact plus the background concentration to show that it does not exceed the AAQS. For PM<sub>10</sub>, the project impact should not exceed the Significant Increment. The results of the model show that the project will not cause a violation, or make significantly worse an existing violation, of any state or national ambient air quality standard. Model results are summarized in the tables below.

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Table D-3 Etiwanda Model Results – Normal Operation

Pollutant	Averaging Period	Maximum Predicted Impact (ug/m3)	Background Concentration (ug/m3)	Total Concentration (ug/m3)	Significant Change Limit (ug/m3)	AAQS (ug/m3)
NO2	1-hour	43.98	220.1	264.1	20	470
	Annual	0.02	58.3	58.3	1	100
CO	1-hour	56.07	4255.0	4311.1	1100	23,000
	8-hour	4.6	3105.0	3109.6	500	10,000
SO2	1-hour	0.17	23.6	23.8	n/a	655
	3-hour	0.12	15.7	15.8	25	1300
	24-hour	0.01	10.5	10.5	1	25
	Annual	0.001	5.2	5.2	1	80
PM10	24-hour	0.21	108.0	108.2	2.5	50
	Annual	0.02	51.0	51.0	1	20

Notes:

Background concentrations obtained from the Fontana Station, except CO which is from the Upland Station Since the South Coast basin is not in compliance with PM10 or CO, the maximum predicted impact of the project cannot exceed the significant change limit for these pollutants, for all other pollutants, the project plus background cannot exceed the AAQS. SO2 1-hour, 3-hour and annual standards are from 40CFR.

Table D-4 Etiwanda Model Results – Startup

Pollutant	Averaging Period	Maximum Predicted Impact (ug/m3)	Background Concentration (ug/m3)	Total Concentration (ug/m3)	Significant Change Limit (ug/m3)	AAQS (ug/m3)
NO2	1-hour	44.42	220.1	264.5	n/a	470
CO	1-hour	56.43	4255.0	4311.4	1100	23,000
	8-hour	4.64	3105.0	3109.6	500	10,000

Notes:

\* background concentrations obtained from the Fontana Station, except CO which is from the Upland Station. For CO, the maximum predicted impact of the project cannot exceed the significant change limit. For NO2, the project plus the background cannot exceed the AAQS.

Table D-5 Etiwanda Model Results - Commissioning

Pollutant	Averaging Period	Maximum Predicted Impact (ug/m3)	Background Concentration (ug/m3)	Total Concentration (ug/m3)	Significant Change Limit (ug/m3)	AAQS (ug/m3)
NO2	1-hour	106.43	220.1	326.53	n/a	470
CO	1-hour	65.06	4255.0	4320.1	1100	23,000
	8-hour	28.7	3105.0	3133.7	500	10,000

Notes:

\* background concentrations obtained from the Fontana Station, except CO which is from the Upland Station. For CO, the maximum predicted impact of the project cannot exceed the significant change limit. For NO2, the project plus the background cannot exceed the AAQS.

The applicant's modeling analyses has been reviewed by the District's modeling staff and deemed acceptable (refer to memo from Jill Whynot to Mike Mills dated 12/22/06, included in the file).

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### 3. Turbine Emission Offsets

Rule 1303(b)(2) requires that all increases in emissions be offset unless exempt from offset requirements pursuant to Rule 1304.

Rule 1304(d) allows for an offset exemption for any facility that has the potential to emit less than 4 tons per year for NO<sub>x</sub>, VOC, SO<sub>x</sub>, and PM<sub>10</sub>, and less than 29 tons per year for CO. The Etiwanda facility qualifies for this exemption based on the following:

Table D-6 Annual PTE Etiwanda Facility

Pollutant	Maximum Turbine Emissions	Maximum Engine Emissions	Total Emissions		Offset Threshold	Exempt
	Lbs/yr	Lbs/yr	Lbs/yr	tpy	tpy	
NO <sub>x</sub>	7802	17	7819	3.9	4	Yes
CO	10881	23	10904	5.5	29	Yes
VOC	1934	6	1940	0.97	4	Yes
PM <sub>10</sub>	6779	0.45	6779	3.4	4	Yes
SO <sub>x</sub>	424	0.03	424	0.21	4	Yes

*\* all turbine emissions come from post commissioning years, except CO which is higher in the commissioning year*

Rule 1313(g) requires that a monthly emission limit be placed on the permit. The monthly emission limits will be reflected in condition A63.

### 4. Engine Offsets and Modeling

The emergency black start engine is exempt from offsets and modeling by Rule 1304(a)(4) – Emergency Equipment. This exemption applies to emergency equipment that is not used for utility power generation and operates less than 200 hours per year. The emergency black start engine will only be used to provide electricity to the turbine so that it can start in the event of a loss of grid power. Therefore, the engine is eligible for this exemption in addition to the 4 ton per year threshold exemption as previously discussed.

### 5. Engine BACT

The engine is natural gas fired and will be used in emergencies only, therefore, it is subject to the emergency stationary engine minor source BACT as follows:

Table D-7 Engine Required BACT

NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	SO <sub>x</sub>
1.5 g/bhp-hr	2.0 g/bhp-hr	1.5 g/bhp-hr	Clean Fuel Policy	Clean Fuel Policy

The engine manufacturer, Waukesha, has guaranteed emission levels for NO<sub>x</sub>, CO, and VOC which will meet the BACT levels as follows:



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Table D-8 Proposed Emission Level for Engine

NOx	CO	VOC	PM10	SOx
1.25 g/bhp-hr	1.75 g/bhp-hr	0.45 g/bhp-hr	Natural gas	Natural gas

#### 6. Ammonia Tank BACT

Use of a pressure vessel for storage and vapor return lines for transfer is considered BACT for an ammonia storage tank.

#### RULE 1401 – New Source Review of Toxic Air Contaminants

This rule specifies limits for maximum individual cancer risk(MICR), cancer burden , and noncancer acute and chronic hazard index (HI) from new permit units, relocations, or modifications to existing permits which emit toxic air contaminants (TAC). The emissions from the turbine are subject to Rule 1401, however, the emergency engine emissions are exempt.

The applicant performed a Tier 4 modeling analysis using the California Air Resources Board Hot Spots Analysis and Reporting Program (HARP), which contains the US EPA ISCST3 model and the latest OEHHA toxicity values. The emission factors used are from US EPA AP-42, April 2000 Table 3.1-3, summarized in Appendix E, with no assumed control efficiency from the oxidation catalyst.

The applicant's modeling information was reviewed by AQMD modeling staff and the analyses were deemed acceptable based on the memo dated 12/22/06. A summary of the modeling results is shown in the following table.

TABLE D-7 - Results of Health Risk Assessment

Receptor	Cancer Risk (per million)	Chronic Hazard Index	Acute Hazard Index
Residential	0.16	4.13E-04	3.42E-03
Off-site worker	0.02	9.01E-04	3.42E-03

The results show that the equipment can be expected to comply with the Rule 1401 thresholds.

#### REGULATION XVII – Prevention of Significant Deterioration

Due to revisions to 40 CFR 52.21, EPA has determined as of March 3, 2003, that the AQMD's Regulation XVII may no longer generally meet the CFR. As a result of this determination, the EPA has revoked and rescinded the AQMD's authority to implement the Prevention of Significant Deterioration (PSD) program for issuing and modifying federal permits for new and modified major sources of attainment pollutants. Therefore, the EPA will process all PSD permits, until authority is again granted to the AQMD for implementing the program. The AQMD has sent the applicant a notification to contact the EPA directly for applicability of PSD. This Regulation is inactive upon EPA's withdrawal of delegation.

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### REGULATION XXX – Title V

The SCE Etiwanda facility is subject to the Title V requirements because it will be an Acid Rain facility [Rule 3001(c)(3)]. SCE has submitted an initial Title V application under A/N 463003. The Title V permit is required to contain the information specified under Rule 3004, including all emission limitations and operational requirements that assure compliance with all applicable regulations, any periodic monitoring requirements, and any necessary recordkeeping to substantiate the facilities compliance status. As a new Title V facility, the proposed permit is subject to a 30 day public notice and a 45 day EPA review and comment period. The public is also allowed to request a permit hearing by filing a request within 15 days of the public notice date [Rule 3006(a)(1)(F)]. The public notice requirements are discussed in more detail under the “Public Notice Requirements” section of this report.

### State Regulations

#### California Environmental Quality Act (CEQA)

An CEQA document was prepared by SCE with the AQMD as lead agency, addressing the environmental impacts of the proposed project. The document is a Mitigated Negative Declaration (MND) meaning any potential significant environmental impacts from the proposed project have been mitigated to insignificant. The draft MND document was sent out for the 30 day public review and comment period on December 27, 2006.

### Federal Regulations

#### NSPS for Stationary Gas Turbines - 40CFR Part 60 Subpart GG

This regulation has been superseded by 60 Subpart KKKK.

The turbine is subject to Subpart GG because the heat input is greater than 10.14 MMBtu per hour (10.7 gigajoules per hour) at peak load, based on the lower heating value of the fuel fired. Actual unit rating is  $467 \times 10^6$  btu/hr (HHV) X 1055 joules/btu = 492.7 gigajoules/hr. The standards which will be applied to the turbine are as follows (see Appendix D for the calculations):

NO<sub>x</sub> = 113 ppm natural gas firing  
SO<sub>x</sub> = 150 ppm

Additional requirement of subpart GG are the measurement and recording of fuel consumption rate, water to fuel ratio, NO<sub>x</sub>, and O<sub>2</sub> emissions (continuous monitoring by Method 20), and sulfur content of the fuel either by daily measurement or by using fuel specs. There is also a requirement for a performance test within 60 days of installation. The permit will contain conditions to require the necessary measurement and recording, and the NO<sub>x</sub> BACT limit of 2.5 ppm will apply at all times, after the initial commissioning period (except start ups during which there will be an alternate mass emission limit). Therefore, compliance with NSPS emission limits is expected.

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*NSPS for Stationary Gas Turbines - 40CFR Part 60 Subpart KKKK*

The turbine is subject to Subpart KKKK because the heat input is greater than 10.7 gigajoules per hour (10.14 MMBtu per hour) at peak load, based on the higher heating value of the fuel fired. Actual unit rating is  $467\text{E}+06$  btu/hr (HHV) X 1055 joules/btu = 492.7 gigajoules/hr. The standards applicable for a turbine between 50 mmbtu/hr and 850 mmbtu/hr are as follows:

NO<sub>x</sub>: 25 ppm at 15% O<sub>2</sub>

SO<sub>x</sub>: 0.90 lbs/MWh discharge, or 0.060 lbs/mmbtu potential SO<sub>2</sub> in the fuel

**Monitoring**

The regulation requires that the fuel consumption and water to fuel ratio be monitored and recorded on a continuous basis, or alternatively, that a NO<sub>x</sub> and O<sub>2</sub> CEMS be installed. For the SO<sub>x</sub> requirement, either a fuel meter to measure input, or a watt-meter to measure output is required, depending on which limit is selected. Also, daily monitoring of the sulfur content of the fuel is required if the fuel limit is selected. However, if the operator can provide supplier data showing the sulfur content of the fuel is less than 20 grains/100cf (for natural gas), then daily fuel monitoring is not required.

**Testing**

An initial performance test is required for both NO<sub>x</sub> and SO<sub>2</sub>. For units with a NO<sub>x</sub> CEMS, a minimum of 9 RATA reference method runs is required at an operating load of +/- 25 percent of 100 percent load. For SO<sub>2</sub>, either a fuel sample methodology or a stack measurement can be used, depending on the chosen limit. Annual performance tests are also required for NO<sub>x</sub> and SO<sub>2</sub>.

Compliance with the requirements of this rule is expected.

*NESHAPS for Stationary Gas Turbines - 40CFR Part 63 Subpart YYYY*

This regulation applies to gas turbines located at major sources of HAP emissions. A major source is defined as a facility with emissions of 10 tpy or more of a single HAP or 25 tpy or more of a combination of HAPs. The largest single HAP emission from the turbine or engine is formaldehyde from the turbine at 438 lbs/yr, or 0.22 tpy. The total combined HAPs from both sources at Etiwanda are less than 25 tpy (reference Appendix E). Therefore, the Etiwanda facility is not a major source, and the requirements of this regulation do not apply.

*40 CFR Part 64 – Compliance Assurance Monitoring*

The CAM regulation applies to emission units at major stationary sources required to obtain a Title V permit, which use control equipment to achieve a specified emission limit. The rule is intended to provide “reasonable assurance” that the control systems are operating properly to maintain compliance with the emission limits. The major source thresholds for the CAM rule, and the Etiwanda facility emissions are summarized as follows:

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Table D-9 EPA Major Source Thresholds

Pollutant	Threshold (tpy)	Etiwanda Emissions (tpy)
VOC	10	0.9
NOx	10	3.9
SOx	100	0.2
CO	50	5.4
PM10	70	3.2

Since the facility is not a major source, the CAM regulations don't apply.

40 CFR Part 72 - (Acid Rain Provisions)

The facility will be subject to the requirements of the federal acid rain program, because the turbine is a utility unit greater than 25 MW. The acid rain program is similar to RECLAIM in that facilities are required to cover SO<sub>2</sub> emissions with "SO<sub>2</sub> allowances" that are similar in concept to RTCs. New facilities such as Etiwanda, are required to purchase SO<sub>2</sub> credits on the open market to cover their annual SO<sub>2</sub> releases, since there are no initial allowance allocations. The applicant is also required to monitor SO<sub>2</sub> emissions through use of fuel gas meters and gas constituent analyses, or, if fired with pipeline quality natural gas, as in the case of the Etiwanda facility, a default emission factor of 0.0006 lbs/mmbtu is allowed. SO<sub>2</sub> mass emissions are to be recorded every hour. NO<sub>x</sub> and O<sub>2</sub> must be monitored with CEMS in accordance with the specifications of Part 75. Under this program, NO<sub>x</sub> and SO<sub>x</sub> emissions will be reported directly to the U.S. EPA. Part 75 requires that the CEMS be installed and certified within 90 days of initial startup. Compliance is expected. Note that Section K of the permit will include the Acid Rain rule references applicable to this facility, specifically Part 72 and Part 73.

Public Notice Requirements

The project is subject to public notice under Rule 212, and Rule 3006. Following are the notice requirements for each rule:

**Rule 212**

The project is subject to the noticing requirements of paragraph (g). This paragraph requires that notification follow the procedures of 40 CFR51, Section 51.161(b), and 40 CFR124, section 124.10. Rule 212(g) also requires 1) the AQMD analysis and information submitted by the operator must be available for public inspection in an area affected, 2) notice by prominent advertisement in the affected area, and 3) mailing a copy of the notice to EPA, CARB, chief executives of the city and county where the source is located, any land use agencies, State and Federal Land Managers or Indian Governing Body whose lands may be affected by the project.

In addition to the above, Section 124.10 requires that the notice be sent to Federal and State agencies with jurisdiction over fish, shellfish, and wildlife resources and over coastal zone management plans, the Advisory Council on Historic Preservation, State and Historic Preservation Officers.

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The applicant must also distribute the notification to all addresses within a ¼ mile radius of the facility.

#### Rule 3006

In addition to the parties receiving the notice under Rules 212 and Rule 3006 requires the notice be sent to those who request in writing to be on a list and other means determined by the EO to insure adequate notice to the affected public. Rule 3006 also requires that the notice contain the following:

- i) The identity and location of the affected facility;
- (ii) The name and mailing address of the facility's contact person;
- (iii) The identity and address of the South Coast Air Quality Management District as the permitting authority processing the permit;
- (iv) The activity or activities involved in the permit action;
- (v) The emissions change involved in any permit revision;
- (vi) The name, address, and telephone number of a person who interested persons may contact to review additional information including copies of the proposed permit, the application, all relevant supporting materials, including compliance documents as defined in paragraph (b)(5) of Rule 3000, and all other materials available to the Executive Officer that are relevant to the permit decision;
- (vii) A brief description of the public comment procedures provided; and,
- (viii) The time and place of any proposed permit hearing that may be held or a statement of the procedures to request a proposed permit hearing if one has not already been requested.

Title V also allows for a 45 day review and comment period by the U.S. EPA.

A copy of the notice and the mailing list of those sent the notice is included in this file.

### **RECOMMENDATION:**

Based on the forgoing analysis, it is recommended that a Permit to Construct be issued following certification of the CEQA document, and subject to the following conditions. The permit should be in the form of a Facility Permit and will serve as the facility's Title V/Acid Rain permit.

### **CONDITIONS:**

#### FACILITY CONDITIONS

- F9.1 Except for open abrasive blasting operations, the operator shall not discharge into the atmosphere from any single source of emissions whatsoever any air contaminant for a period or periods aggregating more than three minutes in any one hour which is:

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(a) As dark or darker in shade as that designated No.1 on the Ringelmann Chart, as published by the United States Bureau of Mines; or

(b) Of such opacity as to obscure an observer's view to a degree equal to or greater than does smoke described in subparagraph (a) of this condition.

[RULE 401, 3-2-1984; RULE 401, 9-11-1998]

#### F24.1 Accidental release prevention requirements of Section 112(r)(7):

a). The operator shall comply with the accidental release prevention requirements pursuant to 40 CFR Part 68 and shall submit to the Executive Officer, as a part of an annual compliance certification, a statement that certifies compliance with all of the requirements of 40 CFR Part 68, including the registration and submission of a risk management plan (RMP).

b). The operator shall submit any additional relevant information requested by the Executive Officer or designated agency.

[40 CFR68]

## GAS TURBINE

#### A63.1 The operator shall limit emission from this equipment as follows:

CONTAMINANT	EMISSION LIMIT
NOx	1556 LBS IN ANY ONE MONTH
PM10	1487 LBS IN ANY ONE MONTH
CO	2134 LBS IN ANY ONE MONTH
SOx	82 LBS IN ANY ONE MONTH
VOC	423 LBS IN ANY ONE MONTH

The operator shall calculate the annual emission limit(s) by using fuel use data and the following emission factors: VOC: 3.15 lbs/mmcf, PM10: 11.19 lbs/mmcf, and SOx: 0.62 lbs/mmcf.

Compliance with the NOx and CO emission limits shall be verified through CEMS data. If NOx and CO CEMS data is not available, NOx and CO emissions shall be calculated using fuel usage and the following factors- NOx: 10.42 lb/mmcf and CO: 15.14 lbs/mmcf during normal operations, and NOx: 7.66 lbs/start, 6.44 lbs/shutdown, CO: 8.58 lbs/start, 7.69 lbs/shutdown.

[Rule 1303 – Offsets]

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A63.2 The operator shall limit emission from this equipment as follows:

CONTAMINANT	EMISSION LIMIT
NO <sub>x</sub>	7800 LBS IN ANY ONE YEAR
PM <sub>10</sub>	6681 LBS IN ANY ONE YEAR
CO	10683 LBS IN ANY ONE YEAR
SO <sub>x</sub>	370 LBS IN ANY ONE YEAR
VOC	1940 LBS IN ANY ONE YEAR

The operator shall calculate the annual emission limit(s) by using fuel use data and the following emission factors: During commissioning with no control- NO<sub>x</sub>: 251.86 lb/mmcf; CO: 173.95 lbs/mmcf, VOC: 8.26 lb/mmcf; PM<sub>10</sub>: 11.19 lbs/mmcf, and SO<sub>x</sub>: 0.62 lb/mmcf . During commissioning with water injection- NO<sub>x</sub>: 103.23 lbs/mmcf, all other factors remain the same. During normal operation- VOC: 3.15 lbs/mmcf, PM<sub>10</sub>: 11.19 lbs/mmcf, and SO<sub>x</sub>: 0.62 lbs/mmcf. THIS CONDITION APPLIES DURING THE 1<sup>ST</sup> 12 MONTHS OF OPERATION ONLY.

Compliance with the NO<sub>x</sub> and CO emission limits shall be verified through CEMS data. If NO<sub>x</sub> and CO CEMS data is not available, NO<sub>x</sub> and CO emissions shall be calculated using fuel usage and the following factors- NO<sub>x</sub>: 10.42 lb/mmcf and CO: 15.14 lbs/mmcf during normal operations, and NO<sub>x</sub>: 7.66 lbs/start, 6.44 lbs/shutdown, CO: 8.58 lbs/start, 7.69 lbs/shutdown.

For the purpose of this condition, the yearly emission limit shall be defined as a period of twelve (12) consecutive months determined on a rolling basis with a new 12 month period beginning on the first day of each calendar month.

[Rule 1303 – Offsets]

A63.3 The operator shall limit emission from this equipment as follows:

CONTAMINANT	EMISSION LIMIT
NO <sub>x</sub>	7802 LBS IN ANY ONE YEAR
PM <sub>10</sub>	7644 LBS IN ANY ONE YEAR
CO	10827 LBS IN ANY ONE YEAR
SO <sub>x</sub>	424 LBS IN ANY ONE YEAR
VOC	2168 LBS IN ANY ONE YEAR

The operator shall calculate the annual emission limit(s) by using fuel use data and the following emission factors: VOC: 3.15 lbs/mmcf, PM<sub>10</sub>: 11.19 lbs/mmcf, and SO<sub>x</sub>: 0.62 lbs/mmcf. THIS CONDITION APPLIES AFTER THE 1<sup>st</sup> 12 MONTHS OF OPERATION.

The operator shall calculate the emission limit(s) and compliance with the NO<sub>x</sub> and CO emission limits shall be verified through CEMS data. If NO<sub>x</sub> and CO CEMS data

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is not available, NOx and CO emissions shall be calculated using fuel usage and the following factors- NOx: 10.42 lb/mmcf and CO: 15.14 lbs/mmcf during normal operations, and NOx: 7.66 lbs/start, 6.44 lbs/shutdown, CO: 8.58 lbs/start, 7.69 lbs/shutdown.

For the purpose of this condition, the yearly emission limit shall be defined as a period of twelve (12) consecutive months determined on a rolling basis with a new 12 month period beginning on the first day of each calendar month.

[Rule 1303 – Offsets]

A99.1 The 2.5 PPM NOx emission limits shall not apply during commissioning, start-up, and shutdown periods. Commissioning shall not exceed 25 hours total, with no more than 5 hrs uncontrolled and no more than 20 hrs with water injection. Each start-up shall not exceed 15 min. Each shutdown shall not exceed 10 min. There shall be no more than 60 start ups per year in the first year of operation, and 120 start-ups per year thereafter. NOx emissions for the hour which includes a start shall not exceed 7.66 lbs, and for the hour which includes a shutdown 6.44 lbs.

[Rule 1303(a) – BACT, Rule 1303(b)(1) – Modeling, Rule 1303(b)(2) - Offsets]

A99.2 The 6.0 PPM CO emission limits shall not apply during commissioning, start-up, and shutdown periods. Commissioning shall not exceed 25 hours total, with no more than 5 hrs uncontrolled and no more than 20 hrs with water injection. Each start-up shall not exceed 15 min. Each shutdown shall not exceed 10 min. There shall be no more than 60 start ups per year in the first year of operation, and 120 start-ups per year thereafter. CO emissions for the hour which includes a start shall not exceed 8.58 lbs, and for the hour which includes a shutdown 7.69 lbs.

[Rule 1303(a) – BACT, Rule 1303(b)(1) – Modeling, Rule 1303(b)(2) - Offsets]

A195.1 The 2.5 PPMV NOX emission limit(s) is averaged over 60 minutes at 15 percent O2, dry.  
[Rule 1303(a) – BACT, Rule 1303(b)(1) – Modeling, Rule 1303(b)(2) - Offsets]

A195.2 The 6.0 PPMV CO emission limit(s) is averaged over 60 minutes at 15 percent O2, dry.  
[Rule 1303(a) – BACT, Rule 1303(b)(1) – Modeling, Rule 1303(b)(2) - Offsets]

A195.3 The 2.0 PPMV VOC emission limit(s) is averaged over 60 minutes at 15 percent O2, dry.  
[Rule 1303(a) – BACT, Rule 1303(b)(1) – Modeling, Rule 1303(b)(2) - Offsets]

A327.1 For the purpose of determining compliance with District Rule 475, combustion contaminants emissions may exceed the concentration limit or the mass emission limit listed, but not both limits at the same time.

[Rule 475]

D12.1 The operator shall install and maintain a(n) flow meter to accurately indicate the fuel usage being supplied to the turbine.



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The operator shall also install and maintain a device to continuously record the parameter being measured.

The measuring device or gauge shall be accurate to within plus or minus 5 percent. It shall be calibrated once every twelve months.

[Rule 1303(b)(2) – Offset]

C1.1 The operator shall limit the fuel usage to no more than 4.43 mmcf in any one day.

The operator shall maintain records in a manner approved by the District to demonstrate compliance with this condition.

[Rule 1303(b)(2) – Offset]

C1.2 The operator shall limit the fuel usage to no more than 597 mmcf in any one year.

The operator shall maintain records in a manner approved by the District to demonstrate compliance with this condition and the records shall be made available upon AQMD request.

For the purpose of this condition, the yearly fuel use limit shall apply only during the 1<sup>st</sup> 12 months of operation.

[Rule 1303(b)(2) – Offset]

C1.3 The operator shall limit the fuel usage to no more than 683 mmcf in any one year.

The operator shall maintain records in a manner approved by the District to demonstrate compliance with this condition.

For the purpose of this condition, the yearly fuel use limit shall apply after the 1<sup>st</sup> 12 months of operation. The yearly emission limit shall be defined as a period of twelve (12) consecutive months determined on a rolling basis with a new 12 month period beginning on the first day of each calendar month.

[Rule 1303(b)(2) – Offset]

D29.1 The operator shall conduct source test(s) for the pollutant(s) identified below.

Pollutant to be tested	Required Test Method(s)	Averaging Time	Test Location
NOX emissions	District Method 100.1	1 hour	Outlet of the SCR
CO emissions	District Method 100.1	1 hour	Outlet of the SCR
SOX emissions	Approved District method	District approved averaging time	Fuel Sample
VOC emissions	Approved District method	1 hour	Outlet of the SCR
PM10 emissions	Approved District	District approved	Outlet of the SCR

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NH3 emissions	method District method 207.1 and 5.3 or EPA method 17	averaging time 1 hour	Outlet of the SCR
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The test shall be conducted after AQMD approval of the source test protocol, but no later than 180 days after initial start-up. The AQMD shall be notified of the date and time of the test at least 10 days prior to the test.

The test shall be conducted to determine the oxygen levels in the exhaust. In addition, the tests shall measure the fuel flow rate (CFH), the flue gas flow rate, and the turbine generating output in MW.

The test shall be conducted in accordance with AQMD approved test protocol. The protocol shall be submitted to the AQMD engineer no later than 45 days before the proposed test date and shall be approved by the AQMD before the test commences. The test protocol shall include the proposed operating conditions of the turbine during the tests, the identity of the testing lab, a statement from the testing lab certifying that it meets the criteria of Rule 304, and a description of all sampling and analytical procedures.

The test shall be conducted when this equipment is operating at loads of 100, 75, and 50 percent.

For natural gas fired turbines only, VOC compliance shall be demonstrated as follows:

a) Stack gas samples are extracted into Summa canisters maintaining a final canister pressure between 400-500 mm Hg absolute, b) Pressurization of canisters are done with zero gas analyzed/certified to contain less than 0.05 ppmv total hydrocarbon as carbon, and c) Analysis of canisters are per EPA Method TO-12 (with pre concentration) and temperature of canisters when extracting samples for analysis is not below 70 deg F.

The use of this alternative method for VOC compliance determination does not mean that it is more accurate than AQMD Method 25.3, nor does it mean that it may be used in lieu of AQMD Method 25.3 without prior approval except for the determination of compliance with the VOC BACT level of 2.0 ppmv calculated as carbon for natural gas fired turbines.

Because the VOC BACT level was set using data derived from various source test results, this alternate VOC compliance method provides a fair comparison and represents the best sampling and analysis technique for this purpose at this time. The test results shall be reported with two significant digits.

[Rule 1303(a)(1) – BACT, Rule 1303(b)(2) – Offset]

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D29.2 The operator shall conduct source test(s) for the pollutant(s) identified below.

Pollutant to be tested	Required Test Method(s)	Averaging Time	Test Location
NH3 emissions	District method 207.1 and 5.3 or EPA method 17	1 hour	Outlet of the SCR

The test shall be conducted and the results submitted to the District within 45 days after the test date. The AQMD shall be notified of the date and time of the test at least 7 days prior to the test.

The test shall be conducted at least quarterly during the first twelve months of operation and at least annually thereafter. The NO<sub>x</sub> concentration, as determined by the CEMS, shall be simultaneously recorded during the ammonia slip test. If the CEMS is inoperable, a test shall be conducted to determine the NO<sub>x</sub> emissions using District Method 100.1 measured over a 60 minute averaging time period.

The test shall be conducted to demonstrate compliance with the Rule 1303 concentration limit

[Rule 1303(a)(1) – BACT]

D29.3 The operator shall conduct source test(s) for the pollutant(s) identified below.

Pollutant to be tested	Required Test Method(s)	Averaging Time	Test Location
SOX emissions	Approved District method	District approved averaging time	Fuel Sample
VOC emissions	Approved District method	1 hour	Outlet of the SCR
PM10 emissions	Approved District method	District approved averaging time	Outlet of the SCR

The test shall be conducted at least once every three years.

The test shall be conducted to determine the oxygen levels in the exhaust. In addition, the tests shall measure the fuel flow rate (CFH), the flue gas flow rate, and the turbine generating output in MW.

The test shall be conducted in accordance with AQMD approved test protocol. The protocol shall be submitted to the AQMD engineer no later than 45 days before the proposed test date and shall be approved by the AQMD before the test commences. The test protocol shall include the proposed operating conditions of the turbine during

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the tests, the identity of the testing lab, a statement from the testing lab certifying that it meets the criteria of Rule 304, and a description of all sampling and analytical procedures.

The test shall be conducted when this equipment is operating at 100 percent load.

The test shall be conducted for compliance verification of the BACT VOC 2.0 ppmv limit.

For natural gas fired turbines only, VOC compliance shall be demonstrated as follows:

a) Stack gas samples are extracted into Summa canisters maintaining a final canister pressure between 400-500 mm Hg absolute, b) Pressurization of canisters are done with zero gas analyzed/certified to contain less than 0.05 ppmv total hydrocarbon as carbon, and c) Analysis of canisters are per EPA Method TO-12 (with pre concentration) and temperature of canisters when extracting samples for analysis is not below 70 deg F.

The use of this alternative method for VOC compliance determination does not mean that it is more accurate than AQMD Method 25.3, nor does it mean that it may be used in lieu of AQMD Method 25.3 without prior approval except for the determination of compliance with the VOC BACT level of 2.0 ppmv calculated as carbon for natural gas fired turbines.

Because the VOC BACT level was set using data derived from various source test results, this alternate VOC compliance method provides a fair comparison and represents the best sampling and analysis technique for this purpose at this time. The test results shall be reported with two significant digits.

[Rule 1303(a)(1) – BACT, Rule 1303(b)(2) – Offset]

D82.1 The operator shall install and maintain a CEMS to measure the following parameters:

NOx and CO concentration in ppmv

Concentrations shall be corrected to 15 percent oxygen on a dry basis. The CEMS shall be installed and operating no later than 90 days after initial startup of the turbine, in accordance with an approved AQMD Rule 218 CEMS plan application. The operator shall not install the CEMS prior to receiving initial approval from AQMD.

The CEMS will convert the actual NOx and CO concentrations to mass emission rates (lbs/hr) and record the hourly emission rates on a continuous basis.

The CEMS shall be installed and operated to measure the NOx and CO concentration over a 15 minute averaging time period.

The CEMS shall convert the actual CO concentrations to mass emission rates (lbs/hr) using the equation below and record the hourly emission rates on a continuous basis.

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CO Emission Rate, lbs/hr =  $K * C_{co} * F_d [20.9 / (20.9\% - \%O_2 d)] [(Q_g * HHV) / 10E6]$ ,  
where

K =  $7.267 * 10^{-8}$  (lbs/scf)/ppm  
Cco = Average of 4 consecutive 15 min. average CO concentrations, ppm  
Fd = 8710 dscf/MMBTU natural gas  
%O2, d = Hourly average % by volume O2 dry, corresponding to Cco  
Qg = Fuel gas usage during the hour, scf/hr  
HHV = Gross high heating value of the fuel gas, BTU/scf

[Rule 1303(a)(1) – BACT, Rule 1303(b)(2) – Offset]

E193.1 The operator shall upon completion of construction, operate and maintain this equipment according to the following specifications:

In accordance with all mitigation measures stipulated in the Negative Declaration prepared for this project ([CEQA State Clearinghouse No. TBD](#)).

[CEQA]

K40.1 The operator shall provide to the District a source test report in accordance with the following specifications:

Source test results shall be submitted to the District no later than 60 days after the source test was conducted.

Emission data shall be expressed in terms of concentration (ppmv) corrected to 15 percent oxygen (dry basis), mass rate (lb/hr), and lb/MMCF. In addition, solid PM emissions, if required to be tested, shall also be reported in terms of grains/DSCF. All exhaust flow rate shall be expressed in terms of dry standard cubic feet per minute (DSCFM) and dry actual cubic feet per minute. All moisture concentration shall be expressed in terms of percent corrected to 15 percent oxygen.

Source test results shall also include the oxygen levels in the exhaust, fuel flow rate (CFH), the flue gas temperature, and the generator power output (MW) under which the test was conducted.

[Rule 1303(a)(1) – BACT, Rule 1303(b)(2) – Offset]

K67.1 The operator shall keep records in a manner approved by the District, for the following parameter(s) or item(s):

Commissioning hours and type of control and fuel use

Date and time of each start-up and shutdown

Natural gas fuel use after the commissioning period and prior to CEMS certification

[Rule 1303(b)(2) - Offsets]

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### SCR/CO CATALYST

A195.4 The 5 ppmv NH<sub>3</sub> emission limit is averaged over 60 minutes at 15% O<sub>2</sub>, dry basis. The operator shall calculate and continuously record the NH<sub>3</sub> slip concentration using the following:

$$\text{NH}_3 \text{ (ppmv)} = [a - b * c / 1\text{E}+06] * 1\text{E}+06 / b$$

where,

a = NH<sub>3</sub> injection rate (lbs/hr)/17(lb/lb-mol)

b = dry exhaust gas flow rate (scf/hr)/385.3 scf/lb-mol)

c = change in measured NO<sub>x</sub> across the SCR (ppmvd at 15% O<sub>2</sub>)

The operator shall install and maintain a NO<sub>x</sub> analyzer to measure the SCR inlet NO<sub>x</sub> ppmv accurate to plus or minus 5 percent calibrated at least once every twelve months. The NO<sub>x</sub> analyzer shall be installed and operated within 90 days of initial start-up.

The operator shall use the above described method or another alternative method approved by the Executive Officer.

The ammonia slip calculation procedures described above shall not be used for compliance determination or emission information without corroborative data using an approved reference method for the determination of ammonia.

[Rule 1303(a)(1) – BACT]

D12.2 The operator shall install and maintain a(n) flow meter to accurately indicate the flow rate of the total hourly throughput of injected ammonia.

The operator shall also install and maintain a device to continuously record the parameter being measured.

The measuring device or gauge shall be accurate to within plus or minus 5 percent. It shall be calibrated once every twelve months.

[Rule 1303(a)(1) – BACT]

D12.3 The operator shall install and maintain a(n) temperature gauge to accurately indicate the temperature in the exhaust at the inlet to the SCR reactor.

The operator shall also install and maintain a device to continuously record the parameter being measured.

The measuring device or gauge shall be accurate to within plus or minus 5 percent. It shall be calibrated once every twelve months.

[Rule 1303(a)(1) – BACT]

D12.4 The operator shall install and maintain a(n) pressure gauge to accurately indicate the differential pressure across the SCR catalyst bed in inches of water column.

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The operator shall also install and maintain a device to continuously record the parameter being measured.

The measuring device or gauge shall be accurate to within plus or minus 5 percent. It shall be calibrated once every twelve months.

[Rule 1303(a)(1) – BACT]

E179.1 For the purpose of the following condition number(s), continuously record shall be defined as recording at least once every hour and shall be calculated based upon the average of the continuous monitoring for that hour.

Condition Number D12.2

Condition Number D12.3

[Rule 1303(a)(1) – BACT]

E179.2 For the purpose of the following condition numbers, continuous monitoring shall be defined as measuring at least once every month and shall be calculated based upon the average of the continuous monitoring for that month.

Condition Number: D12.4

[Rule 1303(a)(1) – BACT]

E193.1 The operator shall upon completion of construction, operate and maintain this equipment according to the following specifications:

In accordance with all mitigation measures stipulated in the Negative Declaration prepared for this project ([CEQA State Clearinghouse No. TBD](#)).

[CEQA]

## BLACK START ENGINE

C1.4 The operator shall limit the operating time to no more than 7 hours per year.

The 7 hours per year limit may include up to ½ hour per month operating time to maintain engine readiness.

[Rule 1110.2, Rule 1304-Exemptions, Rule 1401]

D12.5 The operator shall install and maintain a non-resettable elapsed time meter to accurately indicate the elapsed operating time of the engine.

[Rule 1110.2, Rule 1304-Exemptions, Rule 1401]

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D29.4 The operator shall conduct source test(s) for the pollutant(s) identified below.

Pollutant to be tested	Required Test Method(s)	Averaging Time	Test Location
NOX emissions	District Method 100.1	1 hour	Outlet
CO emissions	District Method 100.1	1 hour	Outlet
VOC emissions	Approved District method	1 hour	Outlet

The test shall be conducted after AQMD approval of the source test protocol, but no later than 180 days after initial start-up. The AQMD shall be notified of the date and time of the test at least 10 days prior to the test.

The test shall be conducted to determine the oxygen levels in the exhaust. In addition, the tests shall measure the fuel flow rate (CFH), the flue gas flow rate, and the engine output in hp.

The test shall be conducted in accordance with AQMD approved test protocol. The protocol shall be submitted to the AQMD engineer no later than 45 days before the proposed test date and shall be approved by the AQMD before the test commences. The test protocol shall include the proposed operating conditions of the turbine during the tests, the identity of the testing lab, a statement from the testing lab certifying that it meets the criteria of Rule 304, and a description of all sampling and analytical procedures.

The test shall be conducted when this equipment is operating at a load of 100 percent.

The test shall be conducted for compliance verification of the NO<sub>x</sub>, CO, and VOC BACT limit.

[Rule 1303(a)(1) – BACT]

K67.2 The operator shall keep records, in a manner approved by the District, for the following parameters or items:

Date of operation, the elapsed time, in hours, and the reason for operation. Records shall be kept and maintained on file for a minimum of two years and made available to district personnel upon request

[Rule 1110.2, Rule 1304-Exemptions, Rule 1401]

E162.1 The operator shall use this equipment only during utility failure periods, except for maintenance purposes.

[Rule 1110.2, Rule 1304-Exemptions, Rule 1401]



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E193.2 The operator shall operate and maintain this equipment according to the following specifications:

[The TA Luft carburetor settings shall be maintained at all times](#)

[Rule 1303-BACT]

### AMMONIA TANK

E144.1 The operator shall vent this equipment, during filling, only to the vessel from which it is being filled.

[Rule 1303-BACT]

C157.1 The operator shall install and maintain a pressure relief valve set at 50 psig.

[Rule 1303-BACT]

### RULE 219 EXEMPT EQUIPMENT

K67.3 The operator shall keep records, in a manner approved by the district, for the following parameter(s) or item(s):

For architectural applications where no thinners, reducers, or other VOC containing materials are added, maintain semi-annual records for all coating consisting of (a) coating type, (b) VOC content as supplied in grams per liter (g/l) of materials for low-solids coatings, (c) VOC content as supplied in g/l of coating, less water and exempt solvent, for other coatings.

For architectural applications where thinners, reducers, or other VOC containing materials are added, maintain daily records for each coating consisting of (a) coating type, (b) VOC content as applied in grams per liter (g/l) of materials used for low-solids coatings, (c) VOC content as applied in g/l of coating, less water and exempt solvent, for other coatings.

[Rule 3004 Periodic Monitoring]

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## Appendix A

### Turbine Emission Calculations

When the turbine is first installed, it must go through several hours of testing to optimize the combustors. For the Etiwanda turbine, SCE has indicated that the commissioning will last 25 hours total. The first 5 hours will be completely uncontrolled, the remaining 20 hours will be controlled with water injection only. After commissioning is over the SCR/CO catalyst will have been installed and operating properly. The 1<sup>st</sup> year will include the higher emissions during commissioning, and therefore, the remaining operation is limited to fewer start ups and less natural gas use to maintain the total emissions below the offset thresholds. The first year of operation will be limited to 60 starts and shutdowns, and a total fuel use for the year of 597 mmcf. All years after commissioning will be limited to 120 starts and shutdowns, and 683 mmcf total annual fuel use. These limitations are reflected in the following calculations.

Data:

Fuel Use Rate	0.403	mmcf/hr
Fuel Use Daily Limit	4.43	mmcf/yr

Pollutant	Controlled Emission Rates	Source
CO	6.10 lbs/hr	Vendor Guarantee
NO <sub>x</sub>	4.20 lbs/hr	Vendor Guarantee
PM10	4.51 lbs/hr	Vendor Guarantee
VOC	<del>4.44</del> 1.27 lbs/hr	Vendor Guarantee
SO <sub>x</sub>	0.0006 mmbtu/hr	AP-42
NH <sub>3</sub>	5 ppm	Vendor Guarantee

### Start Up Emissions

Pollutant	Emission Rate (lbs/hr)
NO <sub>x</sub>	7.66
CO	8.58
VOC	1.34
PM10	4.51
SO <sub>x</sub>	0.25

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#### Shutdown Emissions

Pollutant	Emission Rate (lbs/hr)
NO <sub>x</sub>	6.44
CO	7.69
VOC	1.33
PM10	4.51
SO <sub>x</sub>	0.25

#### Normal Operation Emissions

Pollutant	Fuel Consumption (mmcf/hr)	Pollutant Conc. Uncontrolled (ppmdv)	Pollutant Conc. Controlled (ppmdv)	Emission Rate Uncontrolled (lbs/hr)	Emission Rate Controlled (lbs/hr)	Emission Factor Uncontrolled (lbs/mmcf)	Emission Factor Controlled (lbs/mmcf)
NO <sub>x</sub>	0.403	63	2.5	105.00	4.20	260.55	10.42
CO	0.403	40	6.0	40.67	6.10	100.91	15.14
VOC	0.403	3.0	2.0	1.66	1.27	4.11	3.15
PM10	0.403			4.51	4.51	11.19	11.19
SO <sub>x</sub>	0.403			0.25	0.25	0.62	0.62
NH <sub>3</sub>	0.403	5.0	5.0	3.10	3.10	7.69	7.69

#### Daily/Monthly Emissions

Pollutant	Uncontrolled Emissions Lbs/day	Controlled Emissions lbs/day
NO <sub>x</sub>	1154.22	51.87 <del>51.97</del>
CO	447.03	71.12 <del>71.28</del>
VOC	20.84	14.09 <del>12.67</del>
PM10	49.58	49.58 <del>49.69</del>
SO <sub>x</sub>	2.75	2.75
NH <sub>3</sub>	34.08	34.08

Daily emissions are calculated assuming 1 start up and 1 shutdown per day, with the remaining operation at full load. Total fuel use is 4.43 mmcf/day.

#### Sample Calculations:

Uncontrolled NO <sub>x</sub> :	4.43 mmcf/day*260.55 lbs/mmcf	=	1154.22 lbs
Controlled NO <sub>x</sub> :	7.66 lbs + 6.44 lbs + (4.43 - 0.403*2)10.42 lbs/mmcf	=	51.87 lbs
Controlled PM10:	4.51 lbs + 4.51 lbs + (4.43-0.403*2)11.19 lbs/mmcf	=	49.58 lbs

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#### Monthly Emissions

Pollutant	Controlled Emissions 30 SU/SD lbs/month
NOx	1556.06
CO	2133.74
VOC	422.72
PM10	1487.29
SOx	82.44

Monthly emissions are calculated assuming 1 start up and 1 shutdown per day for 30 days, with the remaining operation at full load. Total fuel use is 4.43 mmcf/day\*30 days.

#### Sample Calculations:

NOx:  $30*(7.66 \text{ lbs}) + 30*(6.44 \text{ lbs}) + 30*(4.43-.403*2)10.42 \text{ lbs/mmcf} = 1556.06 \text{ lbs/month}$   
VOC:  $30*(1.34 \text{ lbs}) + 30*(1.33 \text{ lbs}) + 30*(4.43-.403*2)3.15 \text{ lbs/mmcf} = 422.72 \text{ lbs/month}$

#### Annual Emissions

##### Commissioning Year

Fuel Use Rate	0.403	mmcf/hr
Fuel Use Annual Limit	597	mmcf/yr

#### Emission Rates

	Commissioning 1	Commissioning 2	SU	SD	Normal
Hours	5	20	60	60	1336.39
Fuel	2.015	8.06	24.18	24.18	538.57
NOx, lbs/hr	101.5	41.6	7.66	6.44	4.20
CO, lbs/hr	62.2	62.2	8.58	7.69	6.10
VOC, lbs/hr	3.33	3.33	1.34	1.33	1.27
PM10, lbs/hr	4.51	4.51	4.51	4.51	4.51
SOx, lbs/hr	0.25	0.25	0.25	0.25	0.25

During commissioning the following assumptions were made:

Commissioning 1 NOx – assumed the water injection rate of 41.6 lbs/hr times ratio of 61/25, where 61 is the ppm spike on start up curve provided by GE (representing uncontrolled NOx), and 25 is the ppm during the water injection. Uncontrolled CO and water injection controlled NOx obtained from vendor guarantee spec sheet (Catalyst Design (C06-135-GE Rev 1.pdf).

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Uncontrolled VOC emissions back-calculated assuming 33.3% control from oxidation catalyst.  
60 start ups and shutdowns per year, and 597 mmcf/yr total fuel use.

#### Annual Emissions

Pollutant	Commissioning 1	Commissioning 2	SU	SD	Normal	TOTAL
NOx	507.50	832.00	459.60	386.40	5612.84	7798.34
CO	311.00	1244.00	514.80	461.40	8151.98	10683.18
VOC	16.65	66.60	81.00	79.80	1697.21	1940.66
PM10	22.55	90.20	270.60	270.60	6027.12	6681.07
SOx	1.25	5.00	15.00	15.00	334.10	370.35

#### Sample Calculation:

NOx:  $5 \times (101.5 \text{ lbs/hr}) + 20 \times (41.6 \text{ lbs/hr}) + 60 \times (7.66 \text{ lbs}) + 60 \times (6.44 \text{ lbs}) + 1336.39 \times (4.2 \text{ lbs/hr}) = 7798.34 \text{ lbs/yr}$

#### Post Commissioning

Fuel Use Rate	0.403	mmcf/hr
Fuel Use Annual Limit	683	mmcf/yr

#### Emission Rates

	SU	SD	Normal
Hours	120	120	1454.79
Fuel	48.36	48.36	586.28
NOx, lbs/hr	7.66	6.44	4.20
CO, lbs/hr	8.58	7.69	6.10
VOC, lbs/hr	1.34	1.33	1.27
PM10, lbs/hr	4.51	4.51	4.51
SOx, lbs/hr	0.25	0.25	0.25

#### Annual Emissions

Pollutant	SU	SD	Normal	TOTAL
NOx	919.20	772.80	6110.11	7802.11
CO	1029.60	922.80	8874.21	10826.61
VOC	160.80	159.60	1847.58	2167.98
PM10	541.20	541.20	6561.10	7643.50
SOx	30.00	30.00	363.70	423.70

Annual emissions are calculated assuming 120 start ups and shutdowns per year and 683 mmcf/yr total fuel use.

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Sample Calculation:

NOx:  $120 \times (7.66 \text{ lbs}) + 120 \times (6.44 \text{ lbs}) + 1454.79 \times (4.2 \text{ lbs/hr}) = 7802.11 \text{ lbs/yr}$

Calculated Emission Factors, lbs/mmcf

Pollutant	Commissioning 1	Commissioning 2	SU	SD	Normal
NOx	251.86	103.23	19.01	15.98	10.42
CO	154.34	154.34	21.29	19.08	15.14
VOC	8.26	8.26	3.33	3.30	3.15
PM10	11.19	11.19	11.19	11.19	11.19
SOx	0.62	0.62	0.62	0.62	0.62

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## Appendix B

### Engine Emission Calculations

#### DATA:

Engine HP        865  
 Max heat input 6.43 mmbtu/hr  
 Max fuel use    0.006 mmcf/hr (based on natural gas @ 1050 btu/cf)

Pollutant	Controlled Emission Rates		Source
NOx	1.25	g/bhp-hr	Vendor Guarantee
CO	1.75	g/bhp-hr	Vendor Guarantee
VOC	0.45	g/bhp-hr	Vendor Guarantee
PM10	9.91E-03	lbs/mmbtu	AP-42
SOx	5.88E-04	lbs/mmbtu	AP-42

Pollutant	Emissions	
	lbs/hr	lbs/yr
NOx	2.3816	16.671
CO	3.3343	23.340
VOC	0.8574	6.002
PM10	0.0637	0.446
SOx	0.0038	0.026

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## Appendix C

### Rule 1303 Model Inputs

#### Modeled Emission Rates/Stack Parameters During Normal Operation

Parameter	Etiwanda Turbine	Etiwanda Engine
Stack Diameter, ft	13	0.83
Stack Height, ft	80	14.5
Stack Temp, deg F	665	843
Exhaust Flow, acfm	476744	4646
Stack Velocity, ft/s	59.9	143.1

Pollutant	Averaging	Etiwanda Turbine Emissions (g/s)	Etiwanda Engine Emissions (g/s)
NO2	1-hour	0.529	0.150
	Annual	0.112	2.40E-4
CO	1-hour	0.769	0.191
	Annual	0.769	0.024
SO2	1-hour	0.032	2.38E-4
	3-hour	0.032	7.94E-5
	24-hour	0.015	9.92E-6
	Annual	6.00E-3	3.81E-7
PM10	24-hour	0.260	1.67E-7
	Annual	0.110	6.42E-6

#### Turbine NOx sample calculation:

$$\begin{aligned}
 \text{1-hour} & (4.2 \text{ lbs/hr})(454 \text{ gr/lb})(\text{hr}/3600\text{s}) = 0.529 \text{ g/s} \\
 \text{Annual*} & (60*7.66)+(60*6.44)+(5*101.5)+(20*41.6)+(1336*4.2) \\
 & (7796.7 \text{ lbs/yr})(454 \text{ gr/lb})(\text{yr}/31,536,000\text{s}) = 0.112 \text{ g/s}
 \end{aligned}$$

\* assumes 60 SU, 60 SD, 25 hours of commissioning, remaining fuel at full load, total fuel permit limit 597 mmcf/yr, total hours 1481 at 0.403 mmcf/hr

#### Turbine PM10 sample calculation:

$$\begin{aligned}
 \text{24-hour} & 11.19 \text{ lbs/mmcf}(4.43 \text{ mmcf/day})(454 \text{ gr/lb})(\text{day}/86400\text{s}) = 0.262 \text{ g/s} \\
 & \text{assumes 0.403 mmcf/hr fuel use and 4.51 lbs/hr PM10 emissions, 4.43 mmcf/day permit limit}
 \end{aligned}$$



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Modeled Emission Rates/Stack Parameters During Startup

Parameter	Etiwanda Turbine	Etiwanda Engine
Stack Diameter, ft	13	0.83
Stack Height, ft	80	14.5
Stack Temp, deg F	665	843
Exhaust Flow, acfm	447821	4646
Stack Velocity, ft/s	56.2	143.1

Pollutant	Averaging	Etiwanda Turbine Emissions (g/s)	Etiwanda Engine Emissions (g/s)
NO2	1-hour	0.965	0.150
CO	1-hour	1.081	0.191
	8-hour	0.81	0.024

Modeled Emission Rates/Stack Parameters During Commissioning

Parameter	Etiwanda Turbine
Stack Diameter, ft	13
Stack Height, ft	80
Stack Temp, deg F	665
Exhaust Flow, acfm	238372
Stack Velocity, ft/s	29.9

Pollutant	Averaging	Etiwanda Turbine Emissions (g/s)
NO2	1-hour	12.820
CO	1-hour	7.837
	8-hour	7.837

NOx sample calculation:

$$101.5 \text{ lbs/hr}(454 \text{ gr/lb})(\text{hr}/3600\text{s}) = 12.82 \text{ g/s}$$

CO sample calculation:

$$62.2 \text{ lbs/hr}(454)(\text{hr}/3600\text{s}) = 7.84 \text{ g/s}$$

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## Appendix D

### Toxics Emissions

Emissions of toxics are calculated using the latest factors from EPA, except for ammonia which is calculated using the manufacturer guarantee of 5 ppm slip rate. Turbine maximum heat input is estimated at 423.0 mmbtu/hr using GE data for heat rate and net power for ambient conditions of 102 deg F, as follows:

$$9945 \text{ btu/kw-hr} \times 42534 \text{ kw} = 423.0 \text{ mmbtu/hr}$$

Pollutant	AP-42 Emission Factor (lb/mmbtu)	Maximum Hourly Emission Rate (lb/hr)	Annual Average Emission Rate (lb/yr)
1,3 Butadiene	4.3E-07	1.82E-04	3.08E-01
Acetaldehyde	4.00E-05	1.69E-02	2.87E+01
Acrolein	6.4E-06	2.70E-03	4.59E+00
Benzene	1.50E-05	6.34E-03	1.08E+01
Ethylbenzene	3.20E-05	1.35E-02	2.29E+01
Formaldehyde	7.10E-04	3.00E-01	5.09E+02
Naphthalene	1.30E-06	5.50E-04	9.32E-01
PAH	2.20E-06	9.30E-04	1.58E+00
Propylene Oxide	2.90E-05	1.23E-02	2.08E+01
Toluene	1.30E-04	5.50E-02	9.32E+01
Xylene	6.4E-05	2.70E-02	4.59E+01
Ammonia	N/A	3.10E+00	5.25E+03

### Emergency Engine TACs (for NESHAPS Major Source Determination)

Pollutant	EPA Emission Factor (lb/mmcf)	Maximum Hourly Emission Rate (lb/hr)	Annual Average Emission Rate (lb/yr)
Benzene	4.40E-04	1.77E-04	3.01E-01
Formaldehyde	5.28E-02	2.13E-02	3.61E+01
Naphthalene	7.44E-05	3.00E-05	5.08E-02
Acetaldehyde	8.36E-03	3.37E-03	5.71E+00
Acrolein	5.14E-03	2.07E-03	3.51E+00
1,3 butadiene	2.67E-04	1.08E-04	1.82E-01
Chlorobenzene	3.04E-05	1.23E-05	2.08E-02
Hexane	1.11E-03	4.47E-04	7.58E-01
Toluene	4.08E-04	1.64E-04	2.79E-01
Xylenes	1.84E-04	7.42E-05	1.26E-01
Ethyl benzene	3.97E-05	1.60E-05	2.71E-02
Biphenyl	2.12E-04	8.54E-05	1.45E-01
1,1,2,2-tetrachloroethane	4.00E-05	1.61E-05	2.73E-02

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1,1,2-trichloroethane	3.18E-05	1.28E-05	2.17E-02
1,3-butadiene	2.67E-04	1.08E-04	1.82E-01
1,3-dichloropropene	2.64E-05	1.06E-05	1.80E-02
2,2,4-trimethylpentane	2.50E-04	1.01E-04	1.71E-01
Carbon tetrachloride	3.67E-05	1.48E-05	2.51E-02
Chlorobenzene	3.04E-05	1.23E-05	2.08E-02
Chloroform	2.85E-05	1.15E-05	1.95E-02
Ethylbenzene	3.97E-05	1.60E-05	2.71E-02
Ethylene dibromide	4.43E-05	1.79E-05	3.03E-02
Methanol	2.50E-03	1.01E-03	1.71E+00
Naphthalene	7.44E-05	3.00E-05	5.08E-02
Phenol	2.40E-05	9.67E-06	1.64E-02
Styrene	2.36E-05	9.51E-06	1.61E-02
Tetrachloroethane	2.48E-04	9.99E-05	1.69E-01
Toluene	4.08E-04	1.64E-04	2.79E-01
Vinyl chloride	1.49E-05	6.00E-06	1.02E-02
xylene	1.84E-04	7.42E-05	1.26E-01
Total		2.96E-02	5.01E+01

Emission factors from EPA AP-42 Table 3.2-2 Uncontrolled Emission Factors for 4-Stoke Lean Burn Engines. Only TACs listed on EPA's list of 188 TACs included.

**Total TAC Facility Emissions\***

Turbine		Engine		Total
Lbs/yr	Tons/yr	Lbs/yr	Tons/yr	Tons/yr
739	0.369	50.1	0.025	0.394

\* does not include ammonia

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## Appendix E

### Total Facility Emissions for Major Source Threshold Determinations

#### Criteria Pollutants

Pollutant	Turbine Emissions, lbs/yr		Engine Emissions, lbs/yr	Max Annual Emissions, lbs/yr
	Year 1	Subsequent Years		
NOx	7798.34	7802.11	16.671	7818.781
CO	10683.18	10826.61	23.340	10849.95
VOC	1726.24	1934.02	6.002	1940.022
PM10	5925.56	6779.16	0.446	6779.606
SOx	370.35	423.70	0.026	423.726

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## Appendix F

### Summary of Applications and Processing Fees

The following table summarizes the application submittals and associated processing fees.

A/N	Submittal Date	Equip	Bcat	Fee Sch	Fee
461460	10/26/06	Gas turbine	013008	D	\$3,701.25
461461	10/26/06	Emergency IC engine	043002	B	1695.47
461462	10/26/06	SCR/CO catalysts	81	C	2681.75
461463	10/26/06	Ammonia tank	210900	A	1063.82
463003	11/17/06	Title V	555001		1108.36
Expedited Permit Processing					4571.15
Total					\$14,821.80

The facility will also be required to pay a fee for the public notice, and for the modeling review. There may also be a fee if there is a request for a public hearing. These fees will be billed to the facility after the permit is issued:

Public Notice	\$1,614.36
Modeling Review <sup>(1)</sup>	3,651.67
Sub-Total	\$5,266.03
Public Hearing Fee <sup>(2)</sup>	2,218.48

(1) Plus T&M @ \$104.43/hr if above 35 hours

(2) Plus \$689.76/hr